

CLAIMS

1. A synthesizer arrangement for generating two or more signals simultaneously, the arrangement comprising as input a frequency reference signal generated with stable crystal oscillator means, wherein the arrangement further comprises:

- first synthesizer means arranged to independently generate a first signal from the frequency reference signal, as their output said first signal, and as their input a first control signal controlling the generation, on the basis of which the first signal is changed independently, and
- second synthesizer means arranged to independently generate a second signal from the frequency reference signal, as their output said second signal, and as their input a second control signal controlling the generation, on the basis of which the second signal is changed independently.

2. The synthesizer arrangement according to claim 1, wherein the first and the second synthesizer means comprise a digital fractional-N frequency divider for feedback, the frequency divider being controlled with a bit word which is arranged to be generated by means of a digital sigma-delta calculation circuit, whose input is one of said first and second control signals, which is for example a frequency correction signal or a frequency transfer signal.

3. The synthesizer arrangement according to claim 1, wherein the first signal is coupled to a first RX receiver which is arranged for the reception of first RF signals, and that the second signal is coupled to a second RX receiver which is arranged for the reception of second RF signals.

4. The synthesizer arrangement according to claim 3, wherein the first signal is coupled to a first TX transmitter which is arranged for the transmission of third RF signals.

5 5. The synthesizer arrangement according to claim 3, wherein the first RX receiver and the second RX receiver are arranged in a same multimode radio telephone device which also comprises a first antenna coupled to the first RX receiver and a second antenna coupled to the second RX receiver.

10 6. The synthesizer arrangement according to claim 3, wherein the first RX receiver is arranged to receive first RF signals transmitted by a mobile communication network, the signals containing a synchronization signal, on the basis of which the first control signal is generated, and that the second RX receiver is arranged to receive second RF signals transmitted by a satellite system, on the basis of which the second control signal is generated for tuning of the RX receiver.

15 7. The synthesizer arrangement according to claim 6, wherein the first control signal contains a control code generated on the basis of the synchronization signal in first digital processing means coupled to the first RX receiver, and that the second control signal contains a control code generated in the second digital processor means coupled to the second RX receiver.

20 8. A transceiver system for a multimode radio telephone device comprising:

- 25 – a first part comprising a first antenna and first RF means for receiving and/or transmitting signals, as well as first digital processing means for processing said signals and generating a first control signal,
- 30 – a second part comprising a second antenna and second RF means for receiving and/or transmitting signals, as well as second digital processing means for processing said signals and generating a second control signal, and
- 35 – stable crystal oscillator means for generating a frequency reference signal,

wherein for generating two or more signals simultaneously, the transceiver system also comprises:

- 5 – first synthesizer means arranged to independently generate a first signal from the frequency reference signal, as their output said first signal, and as their input a first control signal controlling the generation, on the basis of which the first signal is independently modified, wherein the first signal is coupled to
- 10 the first RF means, and
- second synthesizer means arranged to independently generate a second signal from the frequency reference signal, as their output said second signal, and as their input a second control signal controlling the generation, on the basis of which
- 15 the first signal is changed independently, wherein the second signal is coupled to the second RF means.

20 9. The transceiver system according to claim 8, wherein the first and the second synthesizer means comprise a digital fractional-N frequency divider for feedback, the frequency divider being controlled with a bit word which is arranged to be generated by means of a digital sigma-delta calculation circuit, whose input is one of said first and second control signals.

25 10. The synthesizer arrangement according to claim 8, wherein the first RF means comprise mixing means whose input is the first signal either as such or in a processed format, the first RF means comprising third synthesizer means for processing the first signal, and that the second RF means comprise mixing means whose input is the second signal

30 either as such or in a processed format, the second RF means comprising fourth synthesizer means for processing the second signal.

35 11. The transceiver system according to claim 8, wherein the first part is an MS part arranged to receive signals transmitted by a mobile communication network, wherein said signals comprise a

synchronization signal for frequency correction, the synchronization signal being used as a basis for forming the first control signal.

12. The transceiver system according to claim 8, wherein the second part is a GPS part arranged to receive signals transmitted by a satellite system, wherein said signals contain information for positioning of a radio telephone device, and wherein the second control signal is arranged to be formed on the basis of the received satellite signal.

13. A method for generating two or more signals, in which method:

- stable crystal oscillator means are used to generate a frequency reference signal,

wherein the method also comprises the steps of:

- inputting said frequency reference signal in first synthesizer means for generating a first signal from the frequency reference signal in the output, and simultaneously inputting in them a first control signal for controlling the generation, on the basis of which the first signal is corrected independently, and
- inputting said frequency reference signal simultaneously also in second synthesizer means for generating a second signal from the frequency reference signal in the output, and simultaneously inputting in them a separate second control signal for controlling the generation, on the basis of which the second signal is corrected independently.

14. The method according to claim 13, wherein in the method:

- the first signal is coupled in first synthesizer means and the second signal in second synthesizer means as feedback via a digital fractional-N frequency divider for comparison of the frequency reference signal,
- said frequency divider is controlled with a bit word, and

- said bit word is generated by means of a digital sigma-delta calculation circuit, in which is input one of said first and second control signals, which is for example a reference correction signal or a frequency transfer signal.

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15. The synthesizer arrangement according to claim 4, wherein the first RX receiver and the second RX receiver are arranged in a same multimode radio telephone device which also comprises a first antenna coupled to the first RX receiver and a second antenna coupled to the second RX receiver.

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16. The synthesizer arrangement according to claim 15, wherein the first RX receiver is arranged to receive first RF signals transmitted by a mobile communication network, the signals containing a synchronization signal, on the basis of which the first control signal is generated, and that the second RX receiver is arranged to receive second RF signals transmitted by a satellite system, on the basis of which the second control signal is generated for tuning of the RX receiver.

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17. The synthesizer arrangement according to claim 5, wherein the first RX receiver is arranged to receive first RF signals transmitted by a mobile communication network, the signals containing a synchronization signal, on the basis of which the first control signal is generated, and that the second RX receiver is arranged to receive second RF signals transmitted by a satellite system, on the basis of which the second control signal is generated for tuning of the RX receiver.

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18. The transceiver system according to claim 11, wherein the second part is a GPS part arranged to receive signals transmitted by a satellite system, wherein said signals contain information for positioning of a radio telephone device, and wherein the second control signal is arranged to be formed on the basis of the received satellite signal.

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